

# DATABASE MANAGEMENT SYSTEMS I

## Project Requirements

The project involves designing a complete database management system to address a practical database need and implementing a relational database based on that design. Your database system should be designed to perform general information management tasks such as systematic collection, update, and retrieval of information for a small organization.

### Rules

- Groups of 1-3 student within the practice session only
- 30% of total course grade
- Deadlines and bonuses
  - (1) Early bird submission:
    - +3 points for everyone for early submission
    - Submit to moodle(including gdrive/git commits if it exists ) by 12th December 2022, 23:59 and defend by 14th December 2022 end of the day to your practice teachers.
    - If you will submit solo (not in a team), you will NOT lose 3 points for team part
  - (2) Normal submission:
    - Submit to moodle(including gdrive/git commits if it exists ) by 17th December 23:59 and defend by 1 day before final examination to your lecturers.
    - If you will submit solo (not in a team), you will lose 3 points for team part
- Presentation of projects will be done to the lecturer and to the instructor together only in English during week#15
- Upload all sql scripts (DB creation and data insertion), report of the project which includes all theory parts(description, ERD, normalization,etc ) to the moodle.
- Please note that the maximum size of each file should not exceed 8MB and the maximum number of files is 20.
- One member from each team can upload, need to mention team members within the practice session only.

### DESIGN PHASE:

#### a) List of project topics to choose from:

- 1) Hospital

- 2) University
- 3) Online market
- 4) Hotel
- 5) Library

**Description:**

- i) Introduction and database description.
- ii) What functions should the system perform? For example, inventory control, billing, ordering, etc.
- iii) Who are the end users? Remember that the DBA is NOT an end user.
- iv) How will data obsolescence be handled?
- v) Where did you get the idea for this project? Did you make it up, get it from work, or find it in a book? Please mention your sources. The idea may NOT be something solved in a book, nor may it be a simple add-on to an existing database.

**b) Entity Relationship Design:**

- i) Draw the ER Diagram for your database.
- ii) Describe your entities. Be sure to define the meaning of each attribute. You must describe the "role" each attribute will play in your table (i.e. what is it and who will use it). You must have enough entities to ensure your project is not a "toy" system.
- iii) Describe your relationships and their type. Be sure to defend your choices. You may wish to give an example to illustrate your choice.

**c) Normalization:**

- i) Show main functional dependencies, keys and superkeys, relationships and subclasses if any, etc.
- ii) Your database should be in Boyce-Codd Normal form.

**d) Physical Design (physical is like table in database)**

- i) How many tables are required:
  - If 1 person in a team: minimum 10 tables, if 2 persons: minimum 16 tables, if 3 persons: minimum 20 tables.

- Fill with data. Data should be filled with enough records(each table should contain at least 100 tuples). It may be fake (You can use Mockaroo to generate fake data).

**e) Requirements for Query part:**

- Your project should have at least 20 queries related to the business process of your project.
  - Query should not be simple
  - Query must be exactly solving some problem
- Queries should contain following topics:
  - Selection, Projection, Update, Alter, Rename, Delete, Order by, Group by, Joins, Subqueries (IN, EXISTS, ANY, ALL), Aggregations, UNION, INTERSECTION, EXCEPT, NULL.
  - Views
  - Constraints
  - Triggers
- Convert each query to relational algebraic form.

**GRADING**

Criteria	Points	Done
<b>Project goal &amp; idea</b> creativity	2 points	
<b>Teamwork</b> (responsibilities), organization	3 points	
<b>ERD</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Schema design</li> <li><input type="checkbox"/> Number of entities</li> <li><input type="checkbox"/> Correctness of relations</li> <li><input type="checkbox"/> Relational Schema</li> <li><input type="checkbox"/> Attributes</li> </ul>	8 points	
<b>Functional Dependencies</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> FD</li> <li><input type="checkbox"/> Usage of keys and superkeys</li> </ul>	3 points	
<b>Normalization</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> 1NF</li> <li><input type="checkbox"/> 2NF</li> <li><input type="checkbox"/> 3NF</li> </ul>	3 points	

<input type="checkbox"/> BCNF		
<b>Queries</b> <input type="checkbox"/> Subqueries <input type="checkbox"/> View <input type="checkbox"/> Joins <input type="checkbox"/> Triggers <input type="checkbox"/> Aggregations <input type="checkbox"/> Relational algebra	8 points	
<b>Transactions</b> <b>Indexes</b>	3points	